The Long-term Decline of the U.S. Job Ladder

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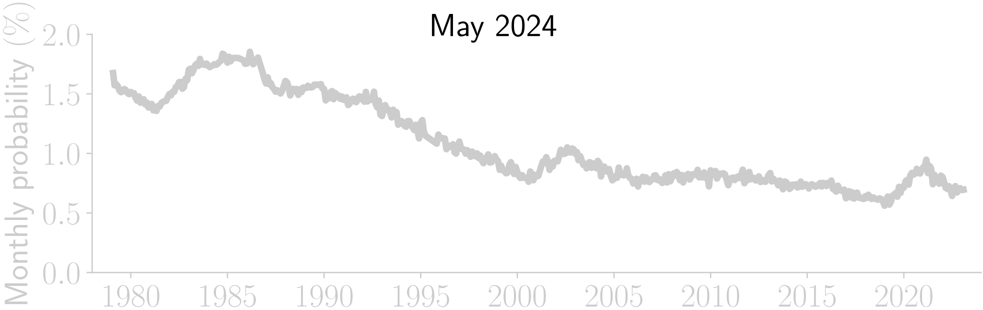

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    2. Macro: alleviating misallocation (Moscarini and Postel-Vinay '17, Bilal et al. '22)
- Yet little is known about long run trends in EE mobility in the U.S.
    * No data before 1994, data post 1994 have issues

This paper

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    - ∗ Prototypical partial equilibrium job-ladder model
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  1. Are workers better matched today?
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- Evaluates 3 hypotheses behind this decline
  1. Are workers better matched today? No
  2. Decline in matching efficiency? No
  3. Increased labor market concentration? May account for 40% of decline

Roadmap

- Theory
- Data and validation
- Three facts on EE mobility
- Explanations for the decline
- Conclusion

Theory

Accounting framework

- We observe 10 workers earning less than w at t and 8 at $t+1$

$\overbrace{\text{earning} \leq w \text{ at } t}^{10}$

$\overbrace{\text{earning} \leq w \text{ at } t+1}^{8}$

Accounting framework

- We observe 10 workers earning less than w at t and 8 at $t+1$
- Between t and $t+1$:
  - $*$ 1 of these workers separates into nonemployment
  - $*$ 2 nonemployed find jobs that pay less than w

$$\underbrace{10}_{\text{earning} \leq w \text{ at } t} - \underbrace{1}_{\text{outflows}} + \underbrace{2}_{\text{inflows}} \qquad \underbrace{8}_{\text{earning} \leq w \text{ at } t+1}$$

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Caveat: this captures transitions toward higher-paying jobs

A partial equilibrium job ladder model

- Unit mass of risk-neutral, infinitely lived workers
- Mass $1 - e_t$ of nonemployed:
  - get job offer with prob. λ_t^n
  - draw from *exogenous* wage offer cdf $F_{t+1}^n(w)$
  - assume all offers are accepted
- Mass e_t of employed:
  - lose job with prob. δ_t
  - get job offer with prob. λ_t^e
  - draw from *exogenous* wage offer distribution $F_{t+1}^e(w)$
  - only accept offers that pay a higher wage

Labor market flows

- Share of workers earning wage w, $g_t(w)$ evolves according to

$$g_{t+1}(w)\,e_{t+1} - g_t(w)e_t \quad =$$

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$$
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& +\underbrace{\lambda_t^e f_{t+1}^e(w)\,G_t(w)e_t}_{\text{EE hires}}
\end{aligned}
$$

Deriving EE mobility

- Integrating (1) and rearranging

$$\underbrace{\lambda_t^e\left(1 - F_{t+1}^e(w)\right)}_{\equiv sep_t^e(w)} = \underbrace{1 - \frac{G_{t+1}(w)}{G_t(w)}\frac{e_{t+1}}{e_t}}_{\text{change in emp.}} + \underbrace{\lambda_t^n \frac{F_{t+1}^n(w)}{G_t(w)}\frac{1-e_t}{e_t}}_{\text{hires from nonemp.}} - \underbrace{\delta_t}_{\text{sep. to nonemp.}}$$

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- And so EE mobility is

$$EE_t \equiv \underbrace{\lambda_t^e}_{\text{job-finding prob.}} \underbrace{\int_{-\infty}^{\infty}\left(1-F_{t+1}^e(w)\right)dG_t(w)}_{\text{average acceptance prob.}} = \underbrace{\int_{-\infty}^{\infty} sep_t^e(w)\, dG(w)}_{\text{average poaching separation prob.}}$$

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- Recover EE given
  - G_t, G_{t+1}, F_{t+1}^n, e_t, e_{t+1}, δ_t, λ_t^n, no need to observe $F_{t+1}^e(w)$

Understanding identification

- In SS, employment in and outflows equal ($\delta_t e_t = \lambda_t^n(1 - e_t)$)

  $\Rightarrow$ separation prob. is $\lambda_t^e \left(1 - F_{t+1}^e(w)\right) = \delta_t \frac{F_{t+1}^n(w) - G_t(w)}{G_t(w)}$

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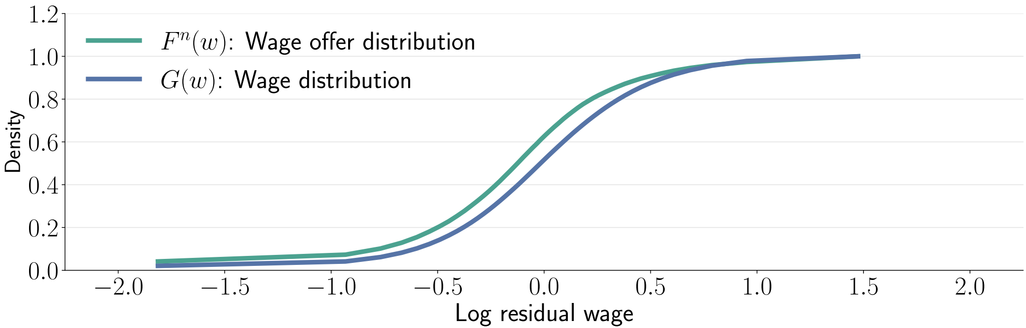
- EE mobility identified by gap $F_{t+1}^n(w) - G_t(w)$



Data and validation

CPS: 1979-2023

- Rotating panel of 60,000 households
- Employment status in months 1-4 and 13-16
  - pin down e_t and e_{t+1}, λ_t^n, and δ_t
- Wages recorded *only* in months 4 and 16
  - project on age$\times$race$\times$gender$\times$education$\times$year, state$\times$date fixed effects
  - bin residuals in 50 bins
  - pin down $G_t(w)$, $G_{t+1}(w)$, and $F_t^n(w)$ (conditional on previous nonemp.)

Validation with *raw* EE: post 1996

- Construct EE mobility in SIPP between 1996 and 2013

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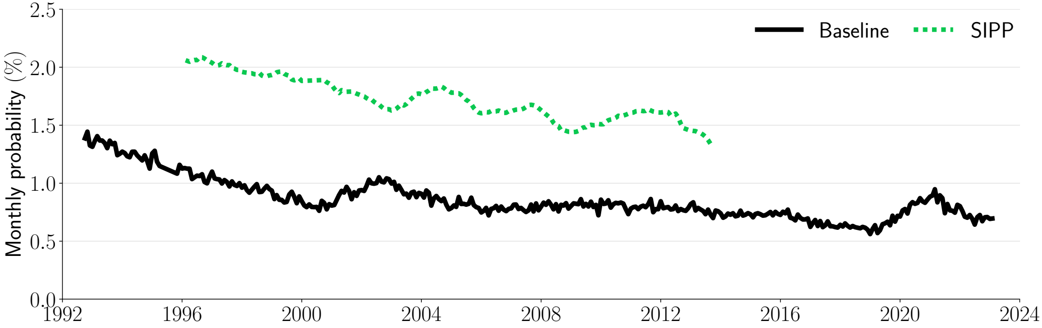
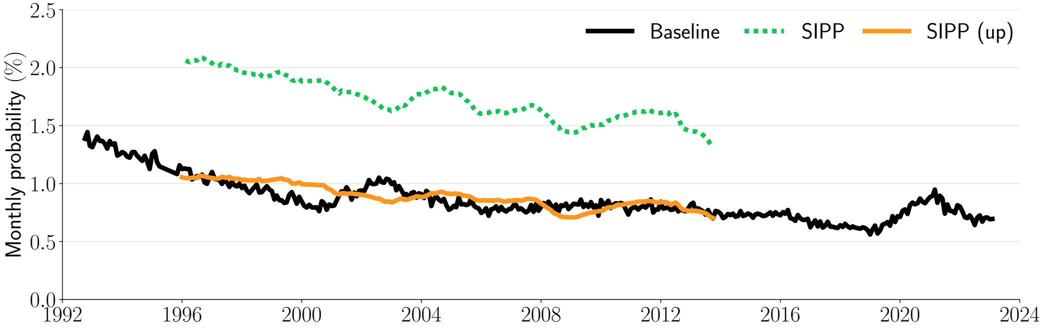


Validation with *raw* EE: post 1996

- Construct EE mobility in SIPP between 1996 and 2013
- Series matches up well with SIPP (up) in both levels and change



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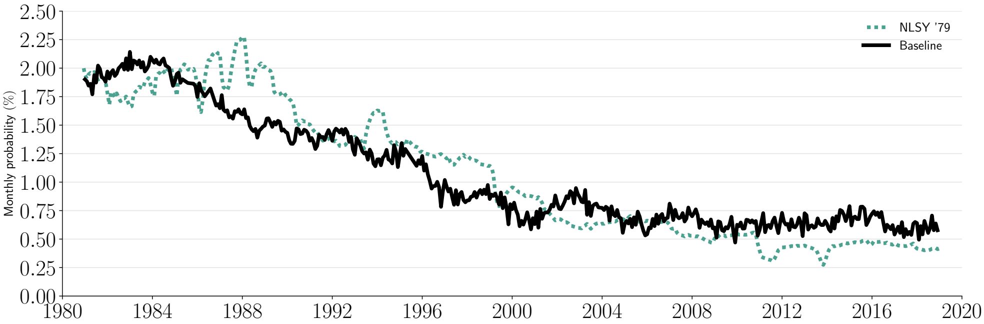

Three facts on EE mobility

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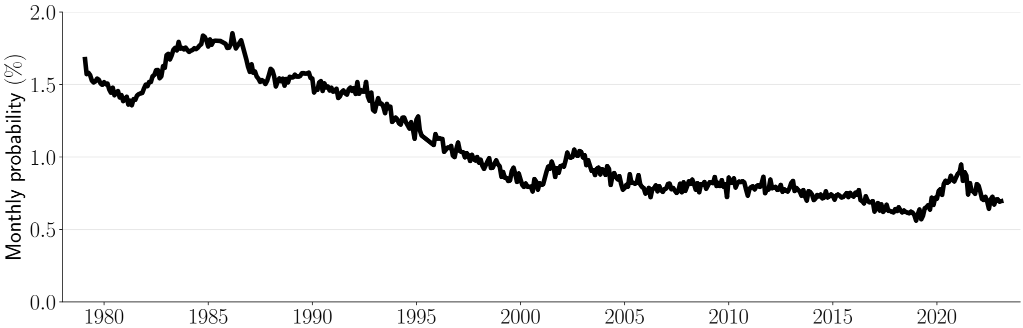
1. EE mobility decline since 1979

Fact 1: EE mobility decline since 1979



▶ Alternative specifications

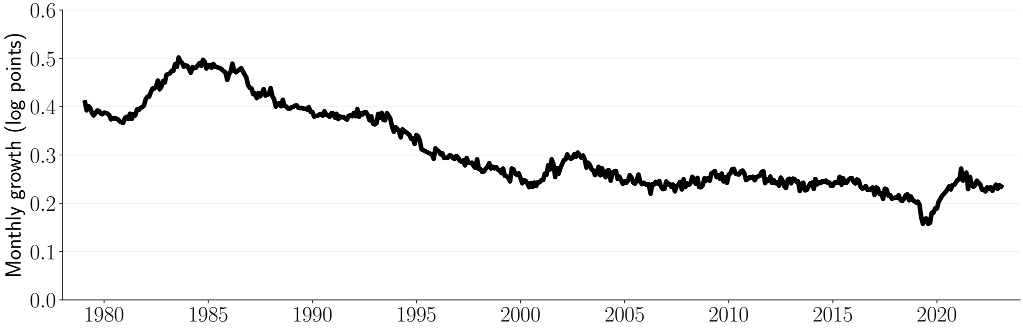
- EE mobility towards higher-paying jobs declined by half from 1979 to 2023

Three facts on EE mobility

1. EE mobility decline since 1979

2. Associated wage growth fell by more than 1 pp.

Fact 2: Associated wage growth fell by more than 1 pp.



▶ OTJ growth

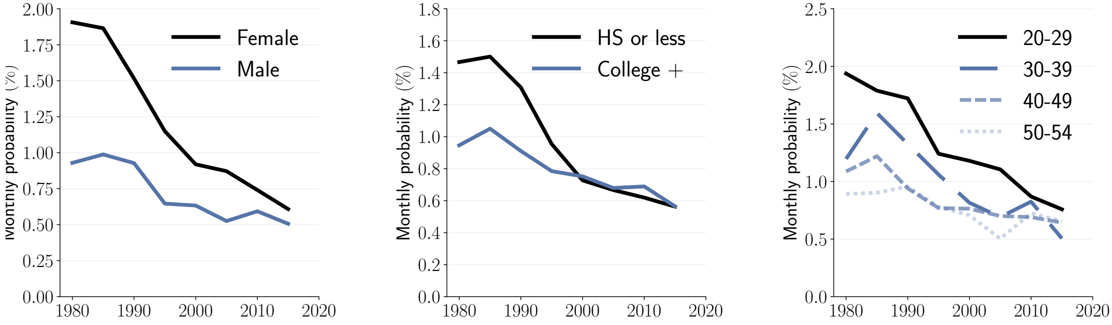
- *Annual* wage growth associated with EE mobility fell by more than 1 pp.

Three facts on EE mobility

1. EE mobility decline since 1979
2. Associated wage growth fell by more than 1 pp.
3. Larger decline for women, less educated, young workers

Fact 3: Larger decline for women, less educated, young

▶ Other groups



Fact 3: Shift-share exercise

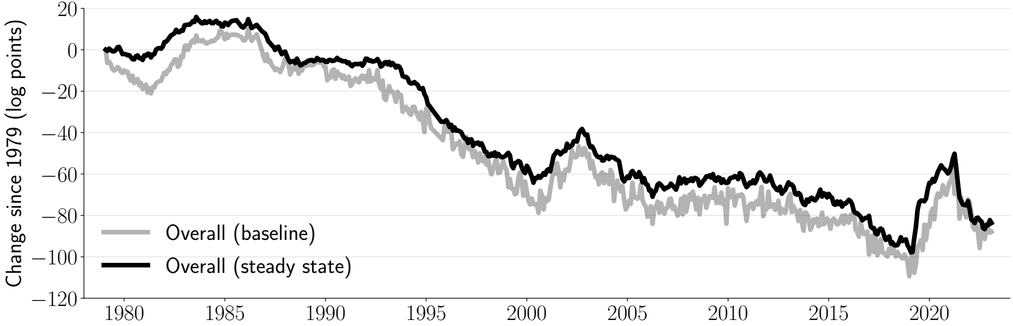
- Age $\times$ education contribute $\sim 1/3$ of overall decline

	Gender	Race	Education	Age	Age×Education
Composition	-3.3%	-1.6%	11.9%	15.2%	28.5%
Within-group	100.3%	100.4%	98.5%	98.0%	90.3%
Covariance	2.9%	1.1%	-10.5%	-13.2%	-18.8%
Total	100%	100%	100%	100%	100%

What is behind the decline?

Due to the secular decline in job-separation?

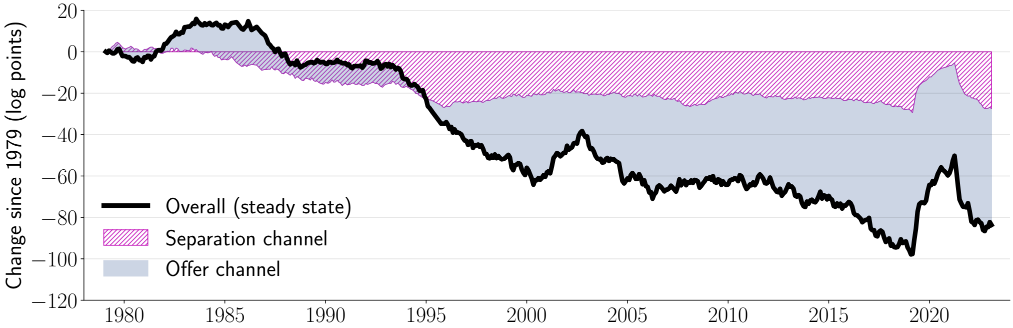
- Higher separation means workers must re-start job ladder climb more often



Due to the secular decline in job-separation?

- Higher separation means workers must re-start job ladder climb more often
- In steady state we have

$$EE = \underbrace{\delta_t}_{\text{separation channel}} \times \underbrace{\int_{-\infty}^{\infty} \frac{F^n_{t+1}(w) - G_t(w)}{G_t(w)}\, dw}_{\text{offer channel}}$$



Testing 3 hypotheses

Consider 3 hypotheses consistent with a decline in EE mobility.

1. Better matched workers
2. Worse matching efficiency
3. Higher firm labor market concentration

Better matched workers?

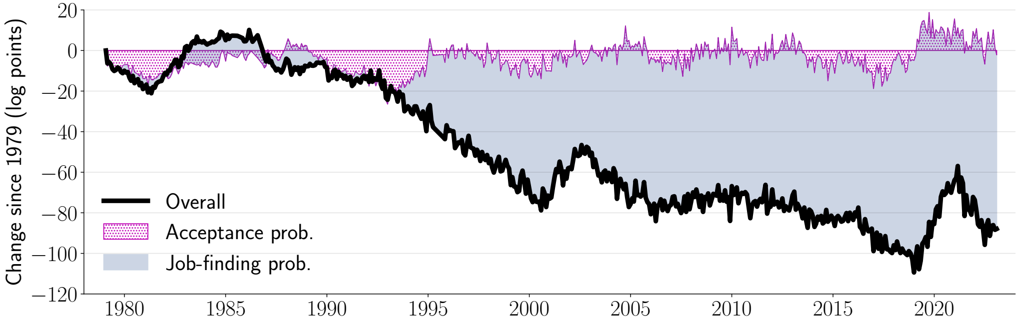
- Did EE mobility fall because workers are better matched today?

Better matched workers?

- Did EE mobility fall because workers are better matched today?
- Recall $EE_t = \underbrace{\lambda_t^e}_{\text{job finding prob.}} \times \underbrace{\int \left(1 - F_{t+1}^e(w)\right) dG_t(w)}_{\text{acceptance prob.}}$

Better matched workers?

- Did EE mobility fall because workers are better matched today?
- Recall $EE_t = \underbrace{\lambda_t^e}_{\text{job finding prob.}} \times \underbrace{\int \left(1 - F_{t+1}^e(w)\right) dG_t(w)}_{\text{acceptance prob.}}$
- Assuming $F^e = F^n$, all EE decline is from job-finding prob.



Worse matching efficiency

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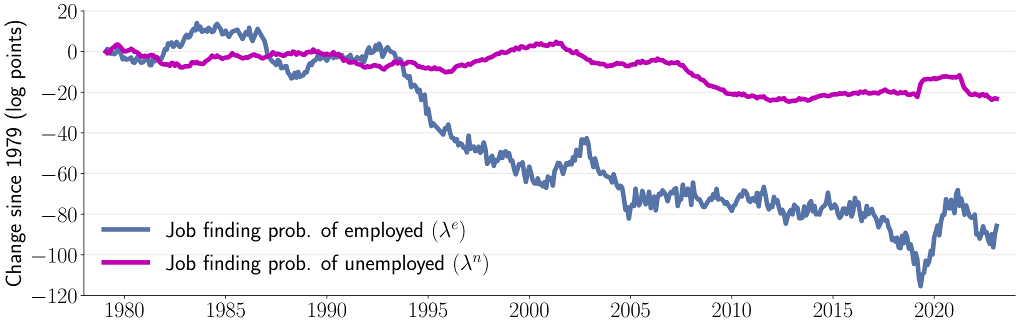
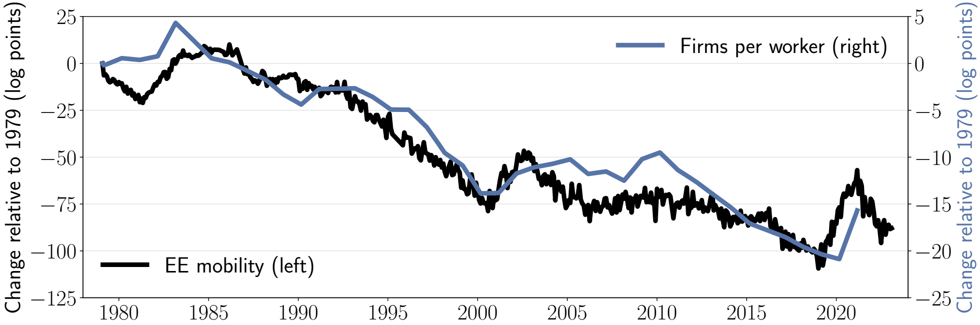
Worse matching efficiency

- Did EE mobility fall because the matching efficiency is worse?
- In DMP models $\lambda^e = s \cdot \lambda^n \implies \lambda^e$ and λ^n should have fallen proportionately
- Theory inconsistent: large decline in λ^e with little decline in λ^n



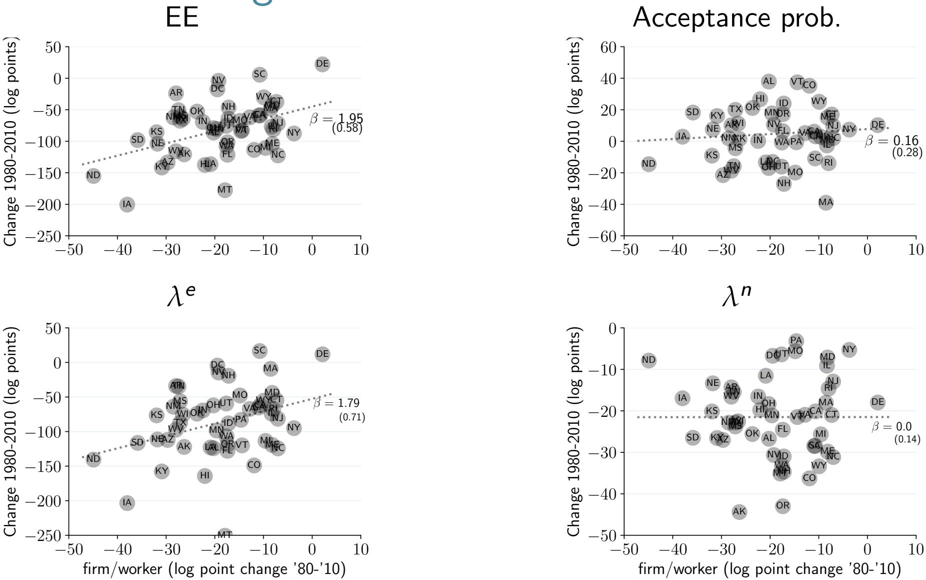
Higher firm labor market concentration

- Did EE mobility fall because of increased firm market concentration?
  - ∗ Higher market concentration lowers workers' opportunities to switch employers



Within-state changes: 1980s - 2010s

▶ Counterfactual



Conclusion

- Estimate EE mobility halved since 1979 using job-ladder model and public data
  - As a consequence, associated annual wage growth fell by over 1 p.p.
  - Bigger declines for women, non-college educated workers, and newer cohorts
- Framework suggests EE decline:
  - inconsistent with better matches and worse matching efficiency
  - consistent with increased firm market concentration

Appendix

OTJ wage growth

▶ Back

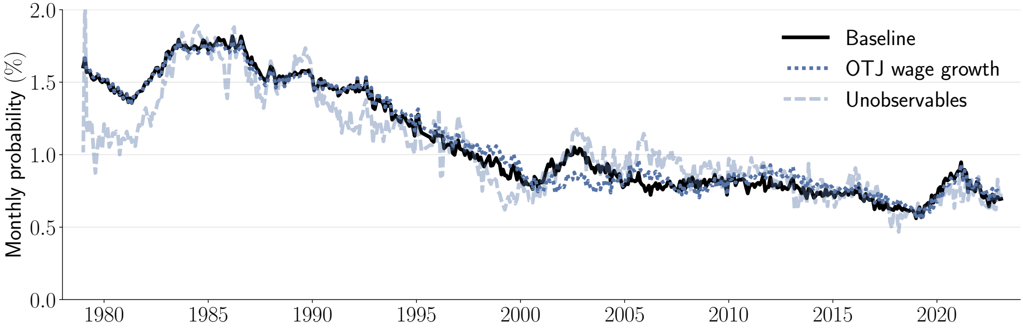
- With OTJ wage growth, EE expression is

$$\lambda_t^e\left(1 - F_{t+1}^e(w)\right) = 1 - \frac{G_{t+1}(w)}{G_t(w)}\frac{e_{t+1}}{e_t} + \lambda_t^n \frac{F_{t+1}^n(w)}{G_t(w)}\frac{1-e_t}{e_t} - \delta_t - \frac{\zeta_t g_t(w)}{G_t(w)}$$

- ζ_t is the rate at which log residual wages grow on-the-job
- Estimated using the CPS *Tenure Supplement*

EE mobility: alternative specifications

▶ Back



Wage growth derivation

▶ Back

$$\Delta w_t^{EE} = \lambda_t^e \int_{-\infty}^{\infty}\int_{w}^{\infty} \Big(\tilde{w} - w\Big) dF_{t+1}^e(\tilde{w}) dG_t(w) \quad = \quad \lambda_t^e \int_{-\infty}^{\infty}\int_{-\infty}^{w} \Big(w - \tilde{w}\Big) dG_t(\tilde{w})\; dF_{t+1}^e(w)$$

Integrating first the inner integral by parts

$$\Delta w_t^{EE} = \lambda_t^e \int_{-\infty}^{\infty} \left(\left[\Big(w - \tilde{w}\Big) G_t(\tilde{w}) \right]_{-\infty}^{w} + \int_{-\infty}^{w} G_t(\tilde{w}) d\tilde{w} \right) dF_{t+1}^e(w) = \lambda_t^e \int_{-\infty}^{\infty}\int_{-\infty}^{w} G_t(\tilde{w}) d\tilde{w} dF_{t+1}^e(w)$$

Integrating the outer integral by parts

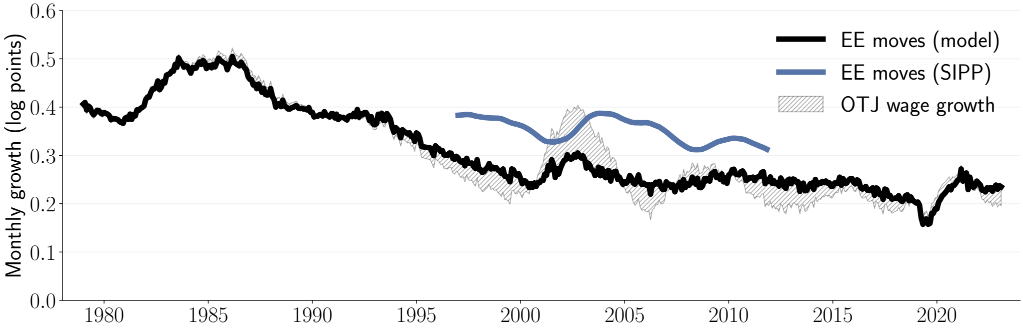
$$\Delta w_t^{EE} \quad = \quad \lambda_t^e \left(\left[\int_{-\infty}^{w} G_t(\tilde{w}) d\tilde{w} F_{t+1}^e(w) \right]_{w=-\infty}^{\infty} - \int_{-\infty}^{\infty} G_t(w) F_{t+1}^e(w) dw \right)$$

Since $\lim_{w \to \infty} F_{t+1}^e(w) = 1$, we have the following

$$\Delta w_t^{EE} \quad = \quad \lambda_t^e \int^{\infty} \Big(1 - F_{t+1}^e(w)\Big) G_t(w) dw$$

Wage growth OTJ

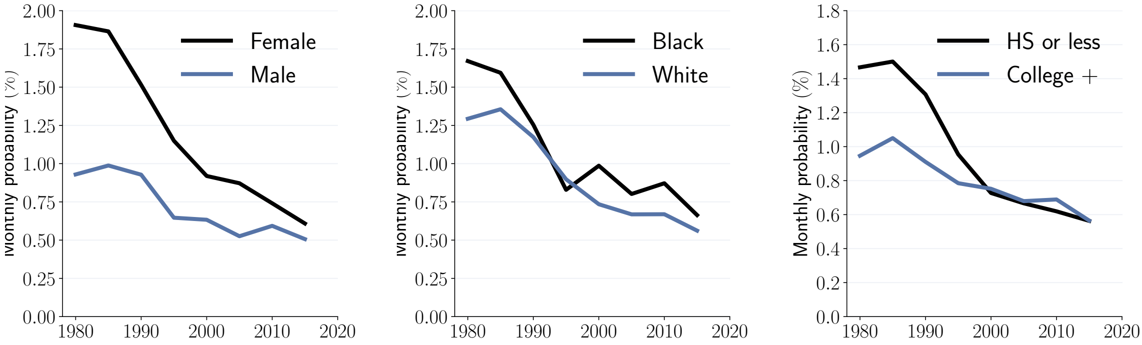
▶ Back



- On the job wage growth accounts for little growth in residual wages

EE by race

▶ Back



Wages by sub-groups

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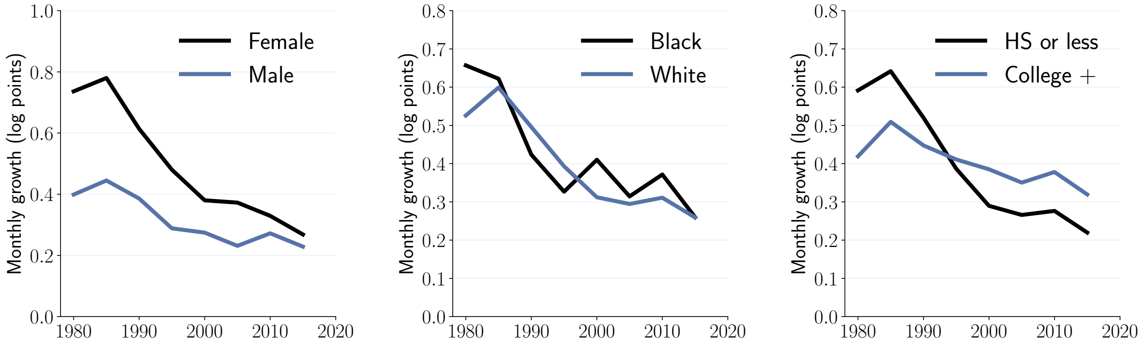
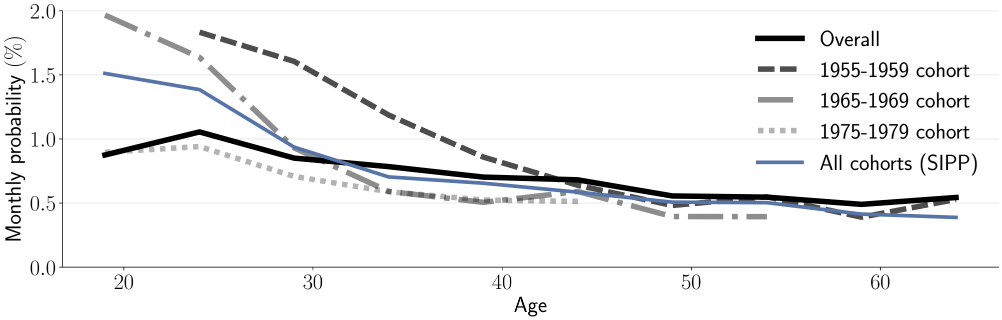


Age, cohort, or time?

▶ Back

- Can quantify role of cohorts (Heckman et al., ’98)
  - $EE_{t,a,c} = \phi_t + \psi_a + \xi_c + \varepsilon_{t,a,c}$
  - leverage fact that mobility is constant for older workers



Identifying assumption: No age variation in EE rate for older workers

Acceptance rate by concentration

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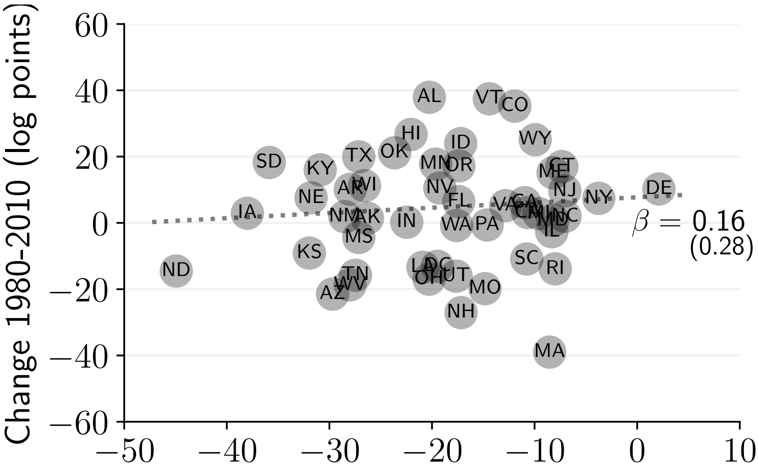

Acceptance rate by concentration

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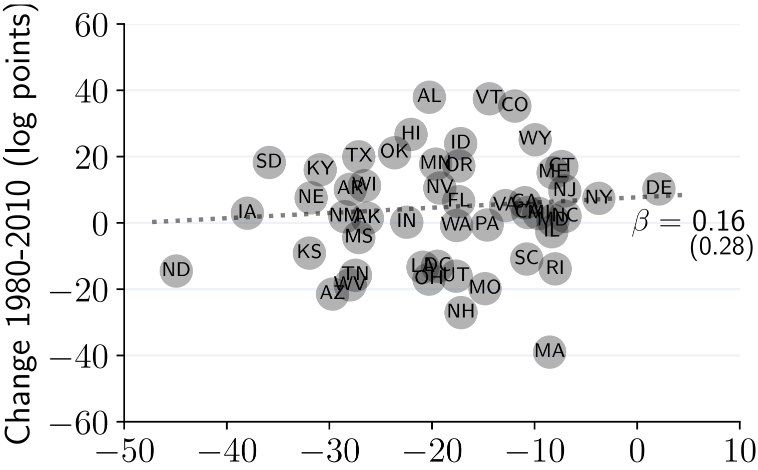


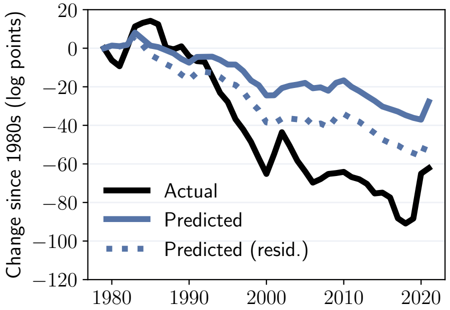
Counterfactual

▶ Back

- EE to concentration elasticity

$$\mathrm{EE}_{s,t} = \beta c_{s,t} + \xi_s + \phi_t + \varepsilon_{s,t}$$

- $\beta = 1.793$ with SE 0.556
- 1% $\uparrow$ firms/worker $\Rightarrow$ 1.8% $\uparrow$ EE



- Concentration increase can account for 40% of decline